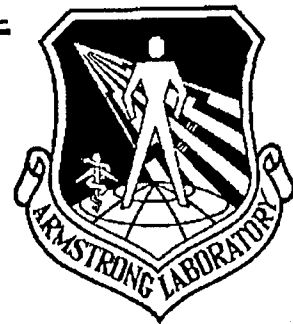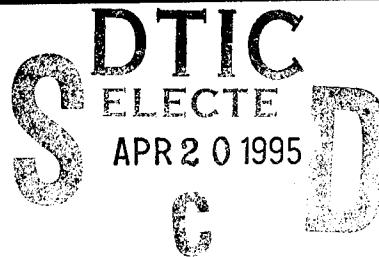AL/HR-CR-1994-0022

# AIR FORCE MANPOWER COST SYSTEM

# USER'S MANUAL

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**AIR FORCE MATERIEL COMMAND**
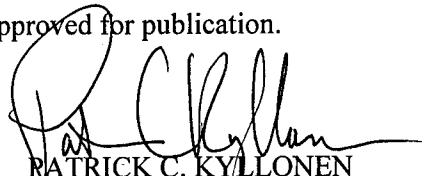**BROOKS AIR FORCE BASE, TEXAS 78235-5352**

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The Public Affairs Office has reviewed this paper, and it is releasable to the National Technical Information Service where it will be available to the general public, including foreign nationals.

This paper has been reviewed and is approved for publication.

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The Air Force Manpower Cost System (AFCOS) is a modification of the Army Manpower Cost System (AMCOS) developed by the Army Research Institute as an aid for cost analysts and hardware designers. AFMCOS determines manpower and personnel costs by skill (AFS) and grade, permitting detailed disaggregated manpower-hardware and manpower-manpower tradeoff analyses. It has been designed to simplify manpower cost analysis. Users may accept or reject various default options as appropriate to the analysis at hand. Such options include choice of discount rates; inflation adjustment by budget category; use of BAQ/VHA in-kind or in cash; and use of average or marginal costs. Special options include choice of Structured Cost Data Base Elements, cost by appropriation, and data editing capabilities to ease analysis of large scale systems. For AFMCOS, was modified to reflect many of the major differences between Army and Air Force costs. However, not all underlying computations were changed. Thus, the current AFMCOS gives approximations rather than precise Air Force costs.

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# TABLE OF CONTENTS

## PREFACE

This work was completed as part of Work Unit 77191927, Development of MPT Acquisition Tradeoff Methods. It provides a preliminary basis for estimating the costs of manpower and other components necessary for new weapon system acquisition and serves as the basis for much of the cost estimating modeling undertaken in the Manpower, Personnel, and Training in Acquisition Decision Support System (MPT DSS) 6.3A prototype development under WU 29220302.

# CHAPTER 1
## AFMCOS INSTALLATION, GLOBAL CONVENTIONS, AND FUNCTIONS

The Air Force Manpower Cost System (AFMCOS) is a modification of the Army Manpower Cost System (AMCOS) developed by the Army Research Institute as an aid for cost analysts and hardware designers. AFMCOS determines manpower and personnel costs by skill (AFS) and grade, permitting detailed disaggregated manpower-hardware and manpower-manpower tradeoff analyses. It has been designed to simplify manpower cost analysis. Users may accept or reject various default options as appropriate to the analysis at hand. Such options include choice of discount rates; inflation adjustment by budget category; use of BAQ/VHA in-kind or in-cash; and use of average or marginal costs. Special options include review of Structured Cost Data Base Elements, cost by appropriation, and data editing capabilities to ease analysis of large scale systems. For AFMCOS, AMCOS was modified to reflect many of the major differences between Army and Air Force costs. However, not all underlying computations were changed. Thus the current AFMCOS gives approximations rather than precise Air Force costs.

Installation:

AFMCOS consists of more than two hundred and fifty executable and data files. While many are small and take up little disk space, some of the larger files will not fit on a single 360K floppy disk. In addition, the files are spread over several directories, the integrity of which must be maintained for the model to operate correctly. However, this is a demonstration version of the system containing only a few Air Force Specialties (AFSs). Therefore, at this time, installation will be accomplished using shareware compression routines. Directions for those routines are provided with diskettes containing the AFMCOS files.

Conventions:

Many conventions and functions are used throughout AFMCOS to ensure the consistency of user interaction with the system.

Menu selection and selection from lists are handled by two methods. In order to make a selection, move to the keyword of choice using the arrow keys, or type the first letter of the keyword. Once you have highlighted the desired keyword, press the <ENTER> key to activate that menu or list selection.

Within every program, AFMCOS gives a set of function keys to perform specific actions. The function keys are described in the prompt windows at the bottom of most screens. In the "View Cost Factors" main menu selection, the function key descriptions appear at the top of the screen.

When AFMCOS prompts you for a file, project, or unit name, the length of the name without the extension cannot exceed eight characters. Further, type only those characters; do not type the extension. For example, enlisted final cost files are displayed with the extension ".fde", but when you enter a new enlisted final cost file name, you do not type ".fde" as part of the name.

Finally, AFMCOS has a convention for selecting items from a list. One function key, usually <F1>, is designated as the mark key for the list. The cursor (or arrow) keys allow you to step through the list. With the cursor at a desired item, you may mark the item by pressing the mark key. Continue the marking process until all selections are made.

**Functions:**

Though the available functions vary by program, the meanings of two keys, <ESC> and <F10>, are consistent throughout AFMCOS. The <ESC> key aborts user input or editing or dismisses a window. The <F10> key allows the user to continue to the next step of the program or to its completion, save any changes and return to the AFMCOS main menu.

Within various AFMCOS programs, you may wish to refer to certain name lists on a recurring basis. These lists, e.g. AFS list, unit list, etc., are available by pressing the function key so identified at the bottom of the screen.

# CHAPTER 2
# MAIN MENU SELECTIONS

The AFMCOS Life Cycle Cost Model (LCCM) operates from an executive shell. From this shell, you can perform a variety of operations, from adjusting the individual costs to executing the life-cycle cost model itself. The options are:

- LCCM Description
- View PMD
- View Cost Factors
- Change Cost Factors
- Edit Unit Database
- Edit Life Cycle Reqts
- Run Life Cycle Model
- Print Results
- Compare Results
- Quit

To activate the AFMCOS executive shell from DOS:

- enter "CD AFMCOS" at the DOS prompt to go to the AFMCOS directory, and

- enter "AFMCOS".

The screen will display a menu with the above options on the right-hand side. To the left hand side will be a status screen identifying the fiscal year from which the underlying database was obtained (Figure 1.)



Figure 1.

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## LCCM Description

**Purpose:** To view a general description of the AFMCOS Life Cycle Cost Model.

**Access:** Highlight the "LCCM Description" selection by cursoring to this menu choice or typing the letter "L", and then by pressing the <ENTER> key.

**Operation:** You may view a brief description of the AFMCOS Life Cycle Cost Model. (Figure 2.)
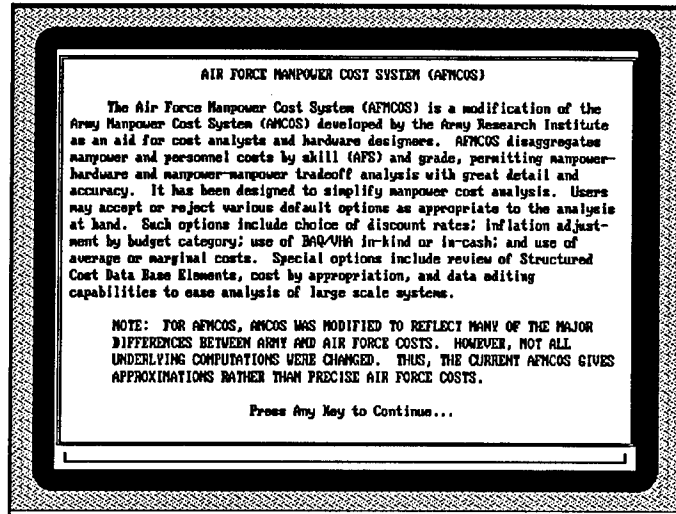


**Figure 2.**

## View PMD

**Purpose:** To view the Policy Module Dictionary.

**Access:** Highlight the "View PMD" selection by cursoring to this menu choice or typing the letter "V" until you arrive at this selection, and then press the <ENTER> key.

**Operation:** The PMD allows you to review definitions of each of the cost elements and their underlying data. Within this option, the <F2> key displays an explanation of the PMD. The PMD menu lists each of the cost elements that AFMCOS uses for cost estimation. You can view the explanation of a cost element and a description of the variables used in the calculations by selecting a cost element from the list. To select a cost element, use the cursor keys to highlight the desired element and press the <ENTER> key. (Figure 3.) Press <F10> to return to the main menu.
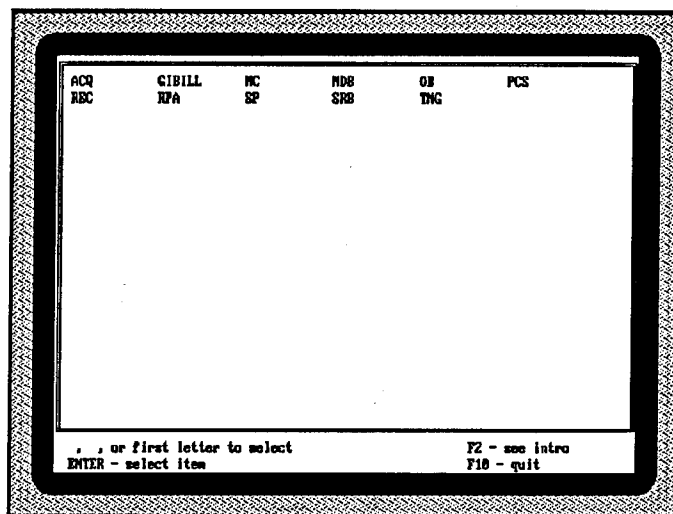


**Figure 3.**

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## View Cost Factors

**Purpose:** To view detailed costs in the Structured Cost Data Base (SCDB) for enlisted personnel and the final costs by appropriation to be used for cost estimation.

**Access:** Highlight the "View Cost Factors" selection by cursoring to this menu choice or typing the letter "V" until you arrive at this selection, and then press the <ENTER> key.

**Operation:** By default, AFMCOS takes the final costs from the cost file DEFAULT.FDE, which has the following specifications:

- Average costs are used instead of marginal costs.
- BAQ/VHA is calculated assuming all cash.
- All costs are enabled.
- Average costs are used for all special pays.

When starting this option, AFMCOS prompts you for an Air Force Specialty (AFS) code, e.g., 452X1C. However before entering a code, you should be sure that you are using the desired final cost file. Press the <F2> key to view the available final cost files. A selection box will appear as in Figure 4. To select a cost file, highlight its name and press the <ENTER> key. Pressing the <ESC> key returns you to the previous process.



**Figure 4.**

Before entering an AFS, you also may want to check the names of the AFSs by pressing the <F1> key to view the AFS list. The list in this demo version is limited to four AFSs as shown in Figure 5.
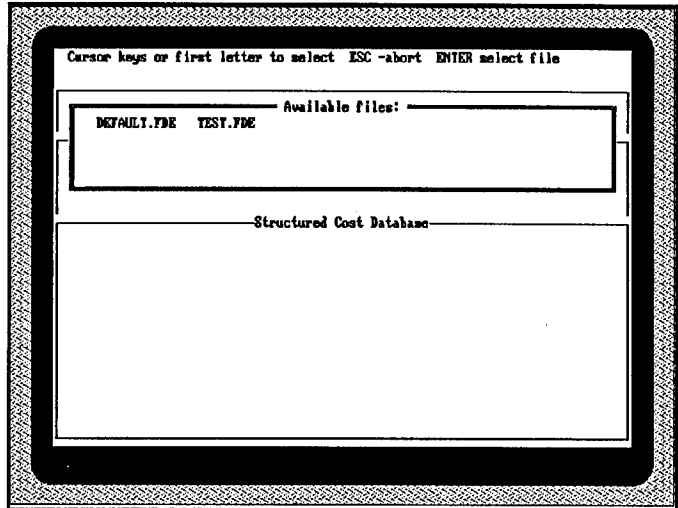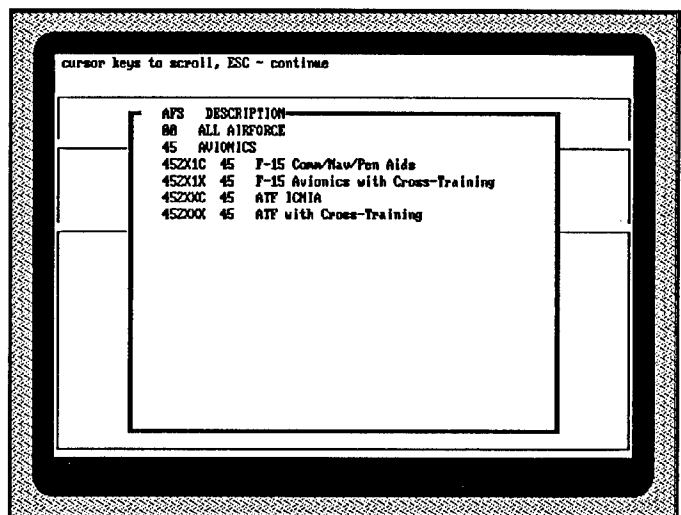


**Figure 5.**

When you are ready to view the enlisted costs, enter an AFS code. (Figure 6.)

The screen display is then divided into three blocks.(Figure 7.) The top block contains a heading which shows the selected AFS and the paygrade headings for the data displayed in the blocks underneath. The middle block displays the total costs for the selected AFS by appropriation and paygrade. The bottom block shows the detailed costs that, for the default final cost file, sum to the totals in the middle block. To view the detailed costs, scroll through the data using the cursor pad keys. The costs are ordered by appropriation, identified in parentheses, and cost element.

In future versions, entering code 00 (all Air Force) or the first two numbers of an AFS will produce a weighted average of overall Air Force costs or of overall AFS group (career area), by cost element; this option is not currently available.



Figure 6.



Figure 7.

When viewing the costs for an individual AFS, the user has three options. Press the <F2> key to view the amortized values that are used for some cost elements (Tng, SRB, Rec). (Figure 8.)[1] These values are added to the appropriation total rather than the unamortized values. Press <F2> again to return to the SCDB values (unamortized).

Future versions will include options for displaying cumulative training costs and cumulative training costs adjusted for attrition. Cumulative training costs will reflect the costs that accumulate over the service of an airman during the transition from skill level 1 to skill level 9.



Figure 8.

---

[1] Tng, SRB, and Rec costs are considered investment costs that should be spread over all subsequent grades rather than at the point they occur. See the AMCOS Active Component Concept Paper for a more detailed discussion of the model's amortization.

## Change Cost Factors

**Purpose:** To modify the enlisted cost file, suppress certain costs, or change the calculation method for selected costs.

**Access:** Highlight the "Change Cost Factors" selection by cursoring to this menu choice or typing the letter "C" until arriving at this selection, and then press the <ENTER> key.

**Operation:** In this program, the top of the screen displays the list of available final cost files. The bottom block of the screen displays the parameter settings of the enlisted final cost file which is currently highlighted at the top of the screen. (Figure 9.) As you cursor through the list of final cost files, the parameter display will change to match the highlighted final cost file.



**Figure 9.**

There are five functions available in this program:

| | |
|---|---|
| <F1> | = edit current file |
| <F2> | = create new file |
| <F3> | = duplicate file |
| <F4> | = delete file |
| <F10> | = exit |

**<F1>.** You may change the parameters of any final cost file other than the default final cost file by pressing the <F1> key and editing the values. A menu on the right side of the screen will display the changes you may make to the highlighted parameters on the left. (Figure 10.)



**Figure 10.**

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There are two types of parameters that you can affect using this edit submenu:

1. You can choose the Basic Allowance for Quarters (BAQ)/Variable Housing Allowance (VHA) calculation based on total cash benefits or based on partially cash/partially in-kind benefits. The mix of in-cash and in-kind BAQ/VHA is based on the percentage of personnel receiving in-kind housing benefits as reflected in the underlying database.

2. You can select or deselect a cost element by choosing "Enable/Disable cost elements" and highlighting elements with the <F1> key. (Figure 11.) All cost elements are highlighted in a newly created cost file. When you disable a cost element, AFMCOS displays it in a different color than the highlighted enabled elements. Press <F10> when finished.
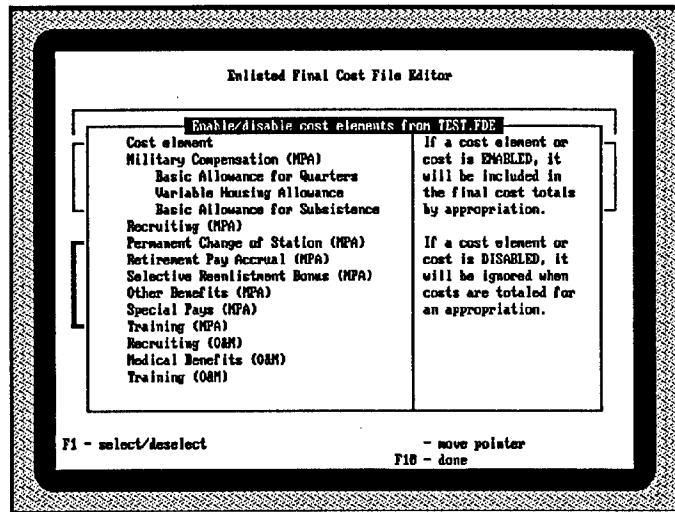


Figure 11.

You must save all changes made to an enlisted cost file in the "Edit current file" option. If you make changes and forget to select the "Save changes" option before selecting "Quit", AFMCOS will ask whether or not you wish to exit and abandon the changes. Typing "N" will allow you to return to the editing menu and select "Save changes". Saving changes can take up to five minutes, depending on the computer being used, because the program must recompute final costs for all AFSs based on your cost assumptions. If you type "Y", AFMCOS abandons any changes made during the editing session.

Functions <F2> through <F10>. In addition to editing final cost files, you may create a new file by pressing the <F2> key, and you may duplicate an existing file by pressing the <F3> key. A newly created file will contain the parameters from the default final cost file; a duplicated file will contain the parameters of the file which it duplicated. You can delete final cost files except the default final cost file by pressing <F4>. Press <F10> to exit to the main AFMCOS menu.

## Edit Unit Database

**Purpose:** To edit and view unit requirements files, where unit requirements are defined in numbers of people.

**Access:** Highlight the "Edit Unit Database" selection by cursoring to this menu choice or typing the letter "E" until you arrive at this selection, and then press the <ENTER> key.

**Operation:** This program displays the unit requirements files available for use in cost estimation. (Figure 12.)[2] The following functions are available:



**Figure 12.**

<F1> = edit current unit
<F2> = show unit names
<F3> = create new unit
<F4> = duplicate unit
<F5> = delete unit
<F6> = view unit names
<F10>= exit

**<F1> and <F2>.** Cursor through the list to highlight the unit that you wish to edit. You may display unit names as you traverse the list by pressing the <F2> key once. (Figure 13.) Strike <F2> a second time to hide the displayed names. Press the <F1> key when you have highlighted the unit that you wish to edit. The screen will display the manning requirements for the selected unit. (Figure 14.)
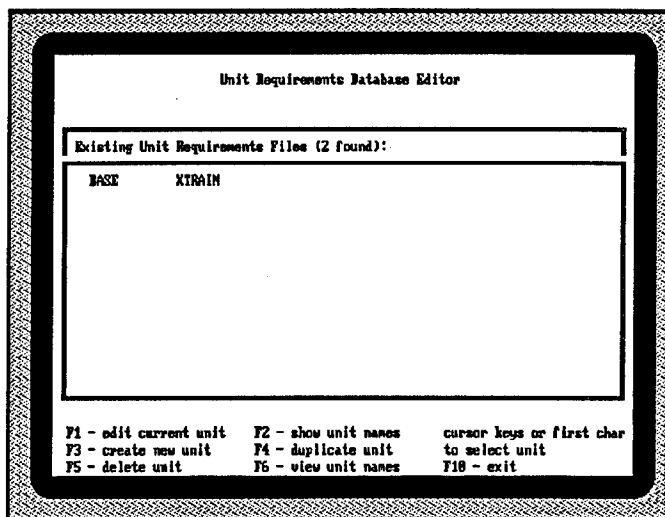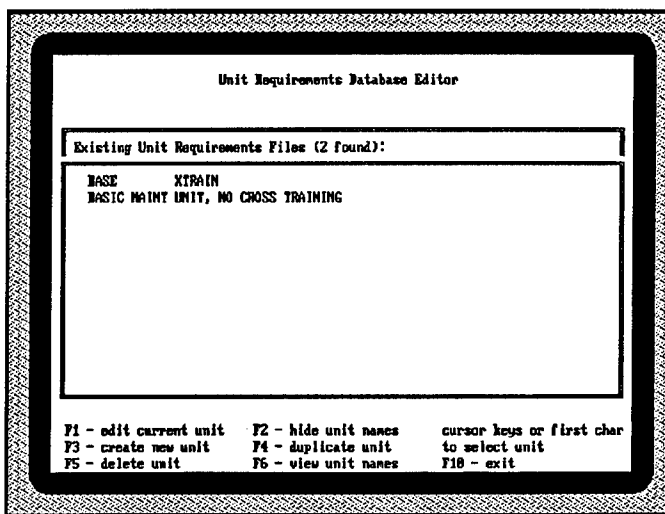


**Figure 13.**

---

[2] When you first activate AFMCOS, your software will have only one "dummy" requirements file. If you have a need for automated input requirements, SRA should be contacted for assistance.

Here you have six edit functions:

<F1> = view AFS list
<F3> = change unit name
<F4> = apply mult to reqts
<F10> = save changes
<INS> = add AFS
<DEL> = delete AFS

When editing, the cursor keys allow you to move from cell to cell on the screen which displays the manning requirements of that particular unit. If you wish to change the value in any cell, simply cursor over to the cell, type the new value, and press the <ENTER> key. The <DEL> key always deletes the current line. Striking the <INS> key allows you to enter a new AFS and the manning requirements for the new AFS. You may enter both fractional and integer manpower requirements.


Figure 14.

In the edit mode, you can view the AFS list by pressing the <F1> key. (Figure 15.) Press <F3> to change the name associated with the unit being edited. To exit, press <F10> to exit and save the changes to the unit requirements file. Press <ESC> to exit and abandon all changes.

<F3> through <F10>. The "Edit Unit Database" menu option also allows you to create a new unit requirements file by pressing the <F3> key. The model will move the cursor to the top of the window and prompt you for the new unit name. Unit names are limited to a maximum of eight characters. Once you have created a new unit requirements file, you may edit it as described above.


Figure 15.

Pressing <F4> allows you to create a new unit by duplicating the requirements of the currently highlighted unit. The model will prompt you for the name of the new file. This unit can now be edited as described above. Pressing <F5> deletes the currently highlighted unit. <F6> displays a list of all units and their descriptions. To exit this program and return to the main AFMCOS menu, press the <F10> key.

## Edit Life Cycle Reqts

**Purpose:** To view and edit requirements files, where life cycle requirements are defined in numbers of units.

**Access:** Highlight the "Edit Life Cycle Reqts" selection by cursoring to this menu choice or by typing the letter "E" until you arrive at this selection, and then press the <ENTER> key.

**Operation:** After entering this option, AFMCOS displays a window with a list of requirements files. (Figure 16.) You may select from six functions:

<F1> = edit current file
<F2> = preview manning
<F3> = create new file
<F4> = duplicate file
<F5> = delete file.
<F10> = exit

**<F1>.** You may edit the requirements file by pressing the <F1> key. Within the edit function, you have eight options:

<F1> = change 1 multiplier
<F2> = change all mults
<F3> = copy current year
<F4> = show (hide) names
<F5> = view unit name list
<F10> = save
<INS> = add unit(s)
<DEL> = delete unit



**Figure 16.**

The model displays each year with units specified for that year. (Figure 17.) If there are no unit requirements in a given year, "NONE" appears. Each unit has a multiplier that indicates how many of that unit exist in the particular year of this requirements file.

Pressing the <F1> key allows you to change the multiplier for the highlighted unit. The cursor moves to the multiplier position for the highlighted unit and year where you enter the new number. Press <F2>, the "Change all Mults" function, to multiply all the multipliers in the year where
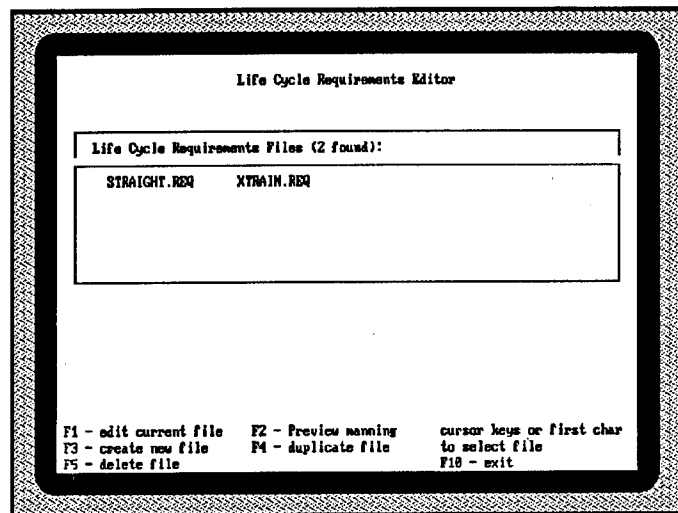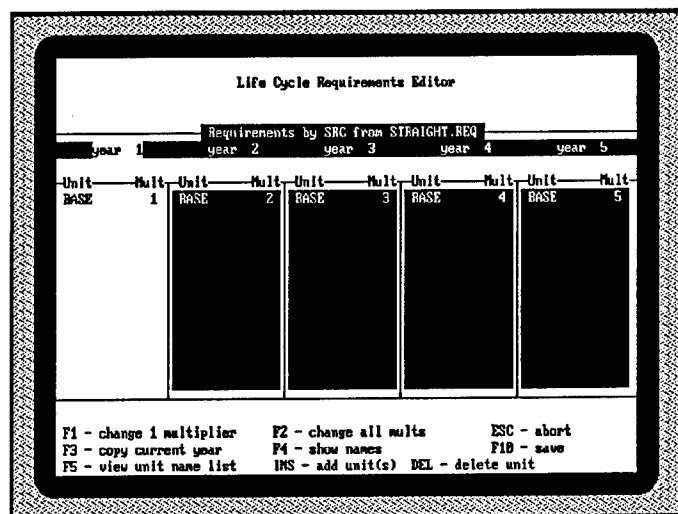


**Figure 17.**

the cursor resides by a factor that you specify. AFMCOS will prompt you for the factor by displaying the following box:

```
Enter factor (ESC to abort) >
```

To divide, specify a fractional multiplier (for example, 0.5 to divide by 2).

"Copy current year" (<F3>) copies all units specified in the highlighted year to each year in a range that you specify. The highlighted year cannot be within the range specified. After you press the <F3> key, AFMCOS will display the following box:

```
Define copy range (ESC to abort)
First year >
Last year  >
```

You then enter a number between one and thirty and press the <ENTER> key to identify the "First year" and "Last year" of the range to be copied into. Pressing <F4> hides or shows the unit names of the highlighted unit; <F5> displays a list of units and their full names.[3]

The <INS> key allows you to add more units to a year. You can type the new unit's name or choose names from the list of available units by pressing the <F1> key. When you enter units through the <INS> key function, you must also enter multipliers for those units.

The <DEL> key function deletes the currently highlighted unit. <F10> saves any changes that you have made and returns you to the main menu. The <ESC> key returns you to the main menu without saving your changes.

<F2> through <F10>. You may view the manning requirements of a single highlighted file by pressing the <F2> key. AFMCOS will prompt you for the year to be previewed by displaying the following box:

```
Enter year to preview (ESC to abort) >
```

---

[3] Note: If a unit in the requirements file has been previously completed while editing the unit database, it will appear at the top of the year column with a star. These units will be ignored during cost estimation.

You must enter a year between one and thirty. AFMCOS will display that year's requirements. (Figure 18.) To create a new requirements file, press <F3>, the "Create file" key. The model will request a new requirements file name. Enter the name, insuring that its length does not exceed eight characters. When you select <F4>, the "Duplicate file" key, AFMCOS will prompt you for a file name where the currently highlighted file will be duplicated. Press <F5> to delete a highlighted file. Press <F10> to exit this program.



**Figure 18.**

## Run Life Cycle Model

**Purpose:** To run a project or view the results of a previously run project over a user specified life cycle with user specified inflation and discount rates.

**Access:** Highlight the "Run Life Cycle Model" selection by cursoring to this menu choice or by typing the letter "R", and then press the <ENTER> key.

**Operation:** In this menu option, AFMCOS displays a list of projects in the upper left window. The remainder of the screen displays information associated with the currently highlighted project. The bottom of the screen displays the totals from the most recently calculated project. (Figure 19.)



**Figure 19.**

If you changed any of the input files or rates or deleted one or more of the input files since the last run, a warning will appear above the prompt window. If you changed one or more input files, you must rerun the project to get the modified results. If you deleted input files, indicated by "*", you cannot run the project for the model may attempt to reference nonexistent files. Further, if you did not specify a requirements file, you will be required to specify one to complete the project definition. (Figure 20.) You must specify all necessary input files before AFMCOS will allow you to run the project.

If an output file is missing, you cannot view the project results. Therefore, if this warning appears, you should also rerun your project to ensure correct numbers.

AFMCOS provides six project functions:

<F1>      = edit current project
<F2>      = create new project
<F3>      = delete project
<F4>      = run model
<F5>      = view last run
<F10>     = exit



**Figure 20.**

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**<F1>.** The first option is for editing the currently highlighted project and is available by pressing the <F1> key. Within the edit option, you can perform any of the following edit functions:

| | |
|---|---|
| <F1> | = Change requirements file |
| <F2> | = Change enlisted cost file |
| <F4> | = Change inflation rates |
| <F10> | = Save |

Pressing <F1> or <F2> displays a window at the top of the screen with the available files, e.g.,

```
┌─────────────────────────────────────────────────┐
│                                                   │
│               Available Files                     │
│                                                   │
│         STRAIGHT.REQ    XTRAIN.REQ                │
│                                                   │
└─────────────────────────────────────────────────┘
```

Select a file by cursoring through the list and pressing the <ENTER> key when the desired file is highlighted.

Initially the model sets the discount rate to 10%, the OMB directed default value, and the inflation rates to the default DoD inflation rates for the base year through the next five years.[4] Press <F4> to change the inflation and discount rates. The rates can be changed by cursoring through the matrix of rates displayed on the screen and revising the values. When you finish editing the project, press <F10> to save your changes or <ESC> to abandon them.

**<F2>.** To create a project, you must press the <F2> key and then enter a project name which does not exceed eight characters in length.

**<F3>.** To delete a highlighted project, you must press the <F3> key.

**<F4>.** Press the <F4> key to tell the model to do the calculations for the project. The prompt window displays the status of the run. When the calculation is complete, the model displays the detailed costs in the upper window and the overall totals at the bottom of the screen. You may cursor through the detailed costs or press the <ESC> key to continue to the graph functions. (Figure 21.)



Figure 21.

---

[4] Year one inflation rates refer to the inflation rates that are applied to AFMCOS year one costs to obtain AFMCOS year two costs.

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**<F5>.** The <F5> key allows you to view the results of a previously run project. If you have not run a project, you may not select this function key. There are five options for viewing results:

<F1> = bar graph
<F2> = log scale bar graph
<F3> = pie graph
<F4> = bar graph by year
<F5> = show detailed costs

When you press the <F1>, <F2>, <F3>, or <F4> keys, AFMCOS will display a graph presenting the results of the previous run. Pressing <F5> displays the detailed costs of the last run in the upper window of the screen. This option is entered automatically upon completion of the project execution by <F4>.

**<F10>.** Pressing the <F10> key again will return you to the main AFMCOS menu.

## Print Results

**Purpose:** To print the results of a previously run life cycle project

**Access:** Highlight the "Print Results" selection by cursoring to this menu choice or by typing the letter "P", and press the <ENTER> key.

**Operation:** When you invoke this menu option, AFMCOS presents a list of projects in the upper left window. The remainder of the screen contains information associated with the currently highlighted project. (Figure 22.) If you previously calculated the project, totals from that run will appear at the bottom of the screen. If any of the input files were changed or deleted since the last run, a warning will appear over the function key window, and deleted files will be starred. If input files were modified, the results may be inaccurate. Further, the print function cannot print the status parameters associated with projects with missing input files. Finally, you are warned if any output files have been deleted since the last run. In this case, you should rerun the project to insure you can print the results.

Highlight the project with results you wish to print. A variety of print options are available:

| <F1> | = print all results |
|------|---------------------|
| <F2> | = print year range w/header |
| <F3> | = print year range |
| <F4> | = print totals w/header |
| <F5> | = print totals |
| <F10> | = exit |

When you select any of these print functions, a message appears to remind you to place your printer ON-LINE. If the printer status is not ON-LINE, the program will not behave normally.

Press the <F1> key to print all the detailed results including a header. The header prints the requirements file name, the inflation and discount rates, the project name, the final cost file names, and the parameters associated with each final cost file.



Figure 22.

Print a selected range of years with the header by using the <F2> key, or print it without the header by using the <F3> key. AFMCOS prompts you for the year range to print by displaying a prompt box:

**Define print range (ESC to abort)**
**First year >**
**Last year >**

You must enter numbers between one and thirty and press the <ENTER> key. Similarly, you may print the final totals with the header by pressing the <F4> key or without the header by pressing the <F5> key.

## Compare Results

**Purpose:** To perform comparisons on the results of previously run life cycle projects.

**Access:** Highlight the "Compare Results" selection by cursoring to this menu choice or by typing the letter "C" until you arrive at "Compare Results", and then press the <ENTER> key.

**Operation:** When you invoke this menu option, AFMCOS presents a list of projects in the upper left window. The remainder of the screen contains information associated with the currently highlighted project. (Figure 23.) Select a base case by highlighting a project name and pressing <F1>. Similarly, select the alternate case by highlighting a project name and pressing <F2>. You cannot choose a project as either the base or alternate case if it has not been run. The function keys <F1> and <F2> will disappear from the prompt window if you have not run the highlighted project. Once you select base and alternate cases, the function "<F3> - show comparison" appears in the prompt window. (Figure 24.) After pressing the <F3> key, the screen displays the results of the comparison between two projects. Both the total discounted and undiscounted costs by appropriation for the base and alternate projects appear on the screen.



**Figure 23.**



**Figure 24.**

In addition, AFMCOS displays the differences between the results of the two projects (alternative- base) by appropriation. (Figure 25.)



Life Cycle Cost Model Comparison

Undiscounted total costs

| | Base case (STRAIGHT.PRJ) | Alternative (XTRAIN.PRJ) | Difference (alt - base) |
|---|---|---|---|
| MPA | 568.444 M | 565.357 M | 4.913 M |
| O&M | 85.797 M | 79.864 M | -5.933 M |
| OTHER | 3.131 M | 3.523 M | 0.392 M |
| TOTAL | 649.372 M | 648.743 M | -0.629 M |

Discounted total costs

| | Base case | Alternative | Difference (alt - base) |
|---|---|---|---|
| MPA | 160.452 M | 189.404 M | 28.952 M |
| O&M | 25.055 M | 27.718 M | 2.663 M |
| OTHER | 0.914 M | 1.189 M | 0.275 M |
| TOTAL | 186.422 M | 218.312 M | 31.890 M |

ESC to continue

Figure 25.

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# CHAPTER 3
## PRACTICAL EXERCISE

Assume the Air Force is comparing two options for fielding F-15 and Advanced Tactical Fighter (ATF) aircraft. In the base (BASE) option, squadrons of the two aircraft will be fielded jointly at single locations with separate maintenance crews. In the second composite (COMPOSIT) option, squadrons of the two aircraft will also be fielded a single locations but will share cross trained maintenance crews. The second option will require that both F-15 and ATF crews receive additional training in maintenance on their secondary aircraft; however, it will require fewer maintainers to maintain satisfactory repair rates. The following steps will describe how the user can use AFMCOS to determine the cost savings of reducing the maintenance crew sizes as compared with the expense of cross training the crews. For demonstration purposes, we have assumed that the number of units will peak at nine. To exercise this version of AFMCOS, the user needs a valid set of manpower requirements profiled over time and a cost file for airmen.

## Step 1 - Manpower requirements

a. To set up a profile of manpower requirements, the user must first create and define a set of unit requirements. To do this, go into the "Edit Unit Database" main menu selection, and create two units, BASE and XTRAIN, using the <F3> key. Edit BASE by pressing the <F1> key. First change the unit name by pressing the <F3> key and entering "Basic Maint Unit, No Cross Training" as the name. Now, set up the following requirements by pressing the <INS> key before entering each AFS:

| enlist | E1-3 | E4 | E5 | E6 | E7 | E8 | E9 |
|--------|------|----|----|----|----|----|----|
| 452X1C | 4 | 8 | 6 | 2 | 2 | 0 | 0 |
| 452XXC | 4 | 8 | 6 | 2 | 2 | 0 | 0 |

\* 452X1C and 452XXC represent F-15 and ATF ICNIA maintainers, only 2 of several AFSs responsible for flightline aircraft maintenance.

Save the requirements for BASE by pressing the <F10> key, and then edit XTRAIN, change the name to "Cross Trained Maint Unit", and set up the following requirements:

| enlist | E1-3 | E4 | E5 | E6 | E7 | E8 | E9 |
|--------|------|----|----|----|----|----|----|
| 452X1X | 4 | 7 | 5 | 2 | 2 | 0 | 0 |
| 452XXX | 4 | 7 | 5 | 2 | 2 | 0 | 0 |

b. Once a set of unit requirements has been created, the user is ready to build a manpower requirements profile over time. To do this, go into the "Edit Life Cycle Reqts" main menu selection and create two requirements files: BASE and COMPOSIT. Edit BASE by pressing the <F1> key. To enter the following requirements, first press the <INS> key, then either type the name of the unit (i.e., BASE) or press the <F1> key to choose from the unit list. If you choose from the unit list, you

move the cursor to the desired unit(s) and press the <F1> key to mark this unit. When finished, press the <F10> key. After you have entered your unit(s), AFMCOS prompts you for the unit multiplier. In the following example, the unit BASE occurs in every year, so you should first enter this unit in year 1. You should then press the <F3> key to copy the current year out to the specified range. Since you need this unit in all 30 years, specify the range 2 through 30. Finally, you must change the multiplier of each of the units. Move the cursor to each cell and press the <F1> key to change the multiplier.

| Yr | Unit (mult) | Yr | Unit (mult) | Yr | Unit (mult) |
|----|-------------|----|-------------|----|-------------|
| 1  | BASE (1)    | 11 | BASE (9)    | 21 | BASE (8)    |
| 2  | BASE (2)    | 12 | BASE (9)    | 22 | BASE (7)    |
| 3  | BASE (3)    | 13 | BASE (9)    | 23 | BASE (6)    |
| 4  | BASE (4)    | 14 | BASE (9)    | 24 | BASE (5)    |
| 5  | BASE (5)    | 15 | BASE (9)    | 25 | BASE (4)    |
| 6  | BASE (6)    | 16 | BASE (9)    | 26 | BASE (3)    |
| 7  | BASE (7)    | 17 | BASE (9)    | 27 | BASE (2)    |
| 8  | BASE (8)    | 18 | BASE (9)    | 28 | NONE        |
| 9  | BASE (9)    | 19 | BASE (9)    | 29 | NONE        |
| 10 | BASE (9)    | 20 | BASE (9)    | 30 | NONE        |

This profile reflects the requirements for maintenance units to support co-located squadrons of aircraft, one each of F-15s and ATFs. One co-located unit is fielded in year one, building to nine in year nine. One co-located unit is retired in year 20, and by year 28, all have been retired.

Save the requirements for BASE by pressing the <F10> key. Edit COMPOSIT and enter the following requirements:

| Yr | Unit (mult) | Yr | Unit (mult) | Yr | Unit (mult) |
|----|-------------|----|-------------|----|-------------|
| 1  | XTRAIN (1)  | 11 | XTRAIN (9)  | 21 | XTRAIN (8)  |
| 2  | XTRAIN (2)  | 12 | XTRAIN (9)  | 22 | XTRAIN (7)  |
| 3  | XTRAIN (3)  | 13 | XTRAIN (9)  | 23 | XTRAIN (6)  |
| 4  | XTRAIN (4)  | 14 | XTRAIN (9)  | 24 | XTRAIN (5)  |
| 5  | XTRAIN (5)  | 15 | XTRAIN (9)  | 25 | XTRAIN (4)  |
| 6  | XTRAIN (6)  | 16 | XTRAIN (9)  | 26 | XTRAIN (3)  |
| 7  | XTRAIN (7)  | 17 | XTRAIN (9)  | 27 | XTRAIN (2)  |
| 8  | XTRAIN (8)  | 18 | XTRAIN (9)  | 28 | NONE        |
| 9  | XTRAIN (9)  | 19 | XTRAIN (9)  | 29 | NONE        |
| 10 | XTRAIN (9)  | 20 | XTRAIN (9)  | 30 | NONE        |

This profile reflects the manpower requirements for maintenance units to support a composite wing composed of a squadron of F-15 aircraft and a squadron of ATF aircraft, where maintenance is performed by a composite unit of cross trained maintenance personnel. The same pattern for numbers of units by year is used for the COMPOSIT analysis as was used for the BASE project. Press the <F10> key to save this last requirements file. You have now completed the manning requirements for this exercise.

## Step 2 - Define and Run Projects

The model is now ready to produce cost estimates for this project. To determine the cost changes due to the two maintenance scenarios, the user needs to run two cases, a baseline and an alternative with savings due to crew reduction and costs due to cross training. Select the "Run Life Cycle Model" main menu option, and create two projects: BASE and COMPOSITE. Edit BASE by pressing the <F1> key. Press the <F1> key again to select BASE as its requirements file. Save the editing change by pressing the <F10> key. Edit COMPOSIT in the same manner and select XTRAIN as its requirements file. Once you have edited the two projects, run each by highlighting its name and pressing the <F4> key. AFMCOS will display the results on the screen. You may view graphic results by pressing the <F1> - <F4> keys. After you view the results, press the <F10> key to continue. At this point, you may run another project or press the <F10> key to exit the "Run Life Cycle Model" menu selection.

## Step 3 - Compare Project Results

   To perform comparisons between projects, enter the "Compare Results" menu selection from the AFMCOS shell.  The <F1> key will make the currently highlighted project the base case, and the <F2> key will make the currently highlighted project the alternative case.  Once you have selected a base and alternative case, you press the <F3> key to view a comparison between the two projects. (Figure 26.)



Figure 26.